coordinated, and that such of the free-air observations made at the six primary stations to be operated by the Weather Bureau, as may be required, shall be made telegraphically available to the military authorities, supplementing similar observations made at the various military stations conducted independently by the Signal Corps. All the data secured at the Weather Bureau and the military stations will be turned over to the Weather Bureau for tabulation and study.

Five aerological stations, in addition to the one already maintained at Drexel, Nebr., are being established as rapidly as possible. One of these stations will be located at Ellendale, N. Dak., and the work in connection therewith has progressed to such an extent that it is expected that it will be in full operation before October 1, 1917. The sites for the other stations have been tentatively selected and the announcement of the exact location will be made later.

NORMAL ANOMALIES OF MEAN ANNUAL TEMPERATURE VARIATIONS.[1]

By H. ARCTOWSKI.

[*Reprinted from* Science Abstracts, Sect. A, July 30, 1917, §591.]

When mean daily temperatures are plotted to form an annual curve certain discontinuities are often observed. Attention has frequently been called to a sudden fall of temperature which often occurs in the spring, particularly in May or June, but it has not been so generally recognized that similar rises of temperature occur in autumn. These discontinuities suggest that the mean annual curve is formed of portions of several smooth curves, the transition from one to the next being brought about by a sudden change as shown in the figure [omitted]. These component curves have not necessarily all the same amplitudes, though in some cases they will be similar and the one simply be displaced up or down from the other. It is suggested that these changes from one curve to another may sometimes be due to a sudden change in the amount of atmospheric moisture above the station with a consequent alteration in the strength of the solar radiation received. There is evidence that the steps occur at approximately the same date at such widely separated stations as Baltimore, Md., in North America, and Barnaoul, in Siberia.—*J. S. Di*[*nes*].

STRUCTURE OF HAILSTONES OF EXCEPTIONAL FORM AND SIZE.[2]

By F. E. LLOYD.

[*Reprinted from* Science Abstracts, Sect. A, July 30, 1917, §594.]

A violent hailstorm of short duration at Carmel, Cal., [—, 1916], yielded large hailstones of unusual shape. Around a central core radiating arms projected having the form of icicles. It is suggested that the stones in the course of their formation were rotating, and thus the arms were built up by the throwing out of the water centrifugally. The suggestion is offered that when hailstones of exceptional type fall molds might be made by pressing plasticine around them before the ice has time to melt, and thus a permanent record of their shape would be obtained.—*J. S. Di*[*nes*].

[1] Amer. jour. sci., May, 1917, 43:402-409; Phil. mag., June, 1917, 33:487-495.
[2] Trans., Roy. Soc. Canada, Sept., 1916, 10:47-50.

IMPROVED METHODS IN HYGROMETRY.[1]

551.508.7 (048)

By A. N. SHAW.

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A hygrometer of a type recently developed by E. K. Rideal and A. Hannah was tested and very satisfactory results obtained. In this instrument a known volume of the sample of air is drawn into the apparatus and the decrease in volume at constant pressure is determined after drying on sulphuric acid. The vapor pressure can be calculated in a few seconds from the reading of the instrument and the barometric pressure at the time. It was found that each observation required only from 2 to 4 minutes and an accuracy within about 1 per cent was obtained, whether the temperature and humidity were high or low.

The principle of a second type of hygrometer tested was based on the fact that certain salts will absorb water from the atmosphere in an amount which is closely proportional to the vapor pressure existing at the time. A clean filter paper moistened with a solution of P_2O_5 was suspended in a bottle from one arm of a balance. A constant stream of air was drawn through the bottle, and it was found that the humidity could be determined satisfactorily from the weight of the paper. The apparatus required to be calibrated by comparison with a standard method, but this once done the paper was found to remain without deterioration for a long time. A convenient form of the instrument can be constructed by hanging the paper from a sensitive spring balance in a tube open at both ends, the air circulation being maintained by a small pilot light in the top of the tube. The spring balance can be graduated to read in vapor pressure directly.—*J. S. Di*[*nes*].

551.57 (048)

FACTORS INFLUENCING THE CONDENSATION OF AQUEOUS VAPOR IN THE ATMOSPHERE.[2]

By A. MASINI.

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Experiments on the condensation of water vapor in the air under different conditions give the following results: The formation of the nuclei which, besides dust, may provoke the condensation of atmospheric aqueous vapor is determined specially by the presence of ozone, nitrogen peroxide, and indirectly ammonia. Electrical discharges, flames (independently of their fumes) and glowing bodies favor condensation in so far as the above substances are formed in their neighborhood. The property exhibited by some substances, of distributing fumes in the air, is identified with the phenomenon of deliquescence, the latter property being manifested without the surrounding medium being saturated with moisture. The conception of a medium saturated with vapor is, at any rate in practice, of relative and not absolute character. This relativity is implied by Kelvin's law, according to which the condensation or dew point depends not only on the vapor pressure but also on the radius of curvature of the surface of bodies in the immediate neighborhood of particles of vapor; it must now be extended to the consideration of the nature of these bodies and of their distance from molecules of the vapor.

Contrary to the conclusions of Lenard and Ramsauer, the action of the ultra-violet light is not necessary for the formation of the nuclei and functions only as a source

[1] Trans., Roy. Soc. Canada, 1916, 10:85-92.
[2] Nuevo Cimento, ———, Sept., 1916, 12: 110-129.